

WO 2005/055838

PCT/GB2004/005168

20

CLAIMS

1. A targeting device for use in open, or minimally invasive, hip surgery to allow the position of the centreline of the femoral neck to be located, which device comprises at least a first component having a portion suitable for location on an outer surface of the femoral neck and a second component having a portion suitable for marking the centreline of the femoral neck, wherein the first and second components are spaced apart from and parallel to one another and means is provided to alter the distance between the first and second components and means is provided to maintain the first and second components in a predetermined position relative to each other.
2. A targeting device according to Claim 1 wherein the first component has a portion suitable for receipt of a first guide wire and the second component has a portion suitable for receipt of a second guide wire.
3. A targeting device according to Claim 1 wherein the first component has a portion suitable for receipt of a first guide wire or the second component has a portion suitable for receipt of a second guide wire.
4. A targeting device according to any of Claims 1 to 3 wherein the first and second components are identical in configuration.
5. A targeting device according to any preceding claim wherein each of the first and second components includes an elongate three dimensional shape for location on an outer surface of the femoral neck or for marking the centreline of the femoral neck.
6. A targeting device according to Claim 5 wherein the elongate three dimensional shape is a cylinder.

WO 2005/055838

PCT/GB2004/005168

21

7. A targeting device according to Claim 5 or Claim 6 wherein each three dimensional shape of the first and second components is 2 to 8cm in length.

8. A targeting device according to any of Claims 5 to 7 wherein a central bore is provided along the centre of each of the elongate three dimensional shapes of the first and second components to receive a guide wire.

9. A targeting device according to Claim 8 wherein the bore has a diameter of 1.5 to 5mm.

10. A targeting device according to any preceding claim wherein the first component is provided with one or more runners, the or each runner is elongate and extends such that its longitudinal axis is perpendicular to that of the first component.

11. A targeting device according to claim 10 wherein the second component is provided with means to movably engage the or each runner.

12. A targeting device according to any of claims 1 to 9 wherein the second component is provided with one or more runners, the or each runner is elongate and extends such that its longitudinal axis is perpendicular to that of the second component.

13. A targeting device according to claim 12 wherein the first component is provided with means to movably engage the or each runner.

WO 2005/055838

PCT/GB2004/005168

22

14. A targeting device according to any of claims Claim 10 to 13 wherein where there are two or more runners and the runners are parallel to each other.
15. A targeting device according to any of Claims 10 to 14 wherein the or each runner is up to 6cm in length.
16. A targeting device according to preceding claim wherein one or more springs is provided between the first and second components to assist movement of the second component away from the first component.
17. A targeting device according to any preceding claim wherein each of the first and second components is provided with a mounting portion and an elongate three dimensional shaped portion and the mounting portion is suitably sized and shaped to receive or co-operate with the elongate three dimensional shaped portion, the or each runner and the means provided to space the first and second components from each other and maintain the first and second components parallel to each other.
18. A targeting device according to claim 17 wherein the elongate three dimensional shaped portions are releasably secured to the mounting portions.
19. A targeting device according to Claim 18 wherein the elongate three dimensional shaped portion have an external screw threaded portion and the mounting portions each have one or more apertures with corresponding internal screw threaded portions to receive and hold the elongate three dimensional portion.
20. A targeting device according to any preceding claim wherein the targeting device is provided with a repositioning device comprising a

WO 2005/055838

PCT/GB2004/005168

23

plate to be secured to the targeting device and having one, two or more tubular components, sized to receive a guide wire, extending therefrom.

21. A targeting device according to any preceding claim wherein the means provided to alter the distance between the first and second components comprises provision of a screw threaded bar received by corresponding screw threaded portions on each of the first and second components.

22. A targeting device according to Claim 21 wherein the screw threaded bar is provided with a suitable means to cause its rotation.

23. A targeting device according to Claim 21 or Claim 22 (when dependent on any of Claims 10 to 20) wherein the longitudinal axes of the or each runner and the screw threaded bar all lie parallel to the longitudinal axis of the elongate support and the longitudinal axes of the first and second components each lie perpendicular to these axes and are spaced apart from and parallel to each other.

24. A targeting device according to any preceding claim wherein the first component is mounted on an elongate support.

25. A targeting device according to claim 24 wherein the elongate support has a handle portion distal from the first component.

26. A targeting device according to claim 24 or 25 wherein the first component is mounted on the elongate support perpendicular to the longitudinal axis of the elongate support.

WO 2005/055838

PCT/GB2004/005168

24

27. A targeting device according to wherein the first component is mounted on an elongate support and the second component is mounted on a bar telescopically received within the elongate support.

28. A targeting device according to any of Claims 24 to 26 wherein the bar is slidably moved into and out of the elongate support by means of a screw thread system.

29. A targeting device according to Claim 28 wherein a rotatable shaft is provided within the elongate support having a screw thread corresponding to a screw thread provided on the telescopically received bar.

30. A targeting device according to Claim 29 (when dependent on any of Claims 10 to 28) wherein the longitudinal axes of the or each runner, the elongate support and the telescopically received bar all lie parallel to the longitudinal axis of the elongate support and the longitudinal axes of the first and second components each lie perpendicular to these axes and are spaced apart from and parallel to each other.

31. A targeting device according to any preceding claim wherein the device further includes at least a third component.

32. A targeting device according to Claim 31 wherein the third component is an "L" shaped bar having a first elongate portion and a second elongate portion, the second elongate portion extending generally perpendicularly to the first elongate portion.

33. A targeting device according to Claim 32 wherein the length of the first elongate portion is greater than that of the second elongate portion.

WO 2005/055838

PCT/GB2004/005168

25

34. A targeting device according to claim 32 or 33 wherein the "L" shaped bar is of square or rectangular cross section.

35. A targeting device according to any of claims 32 to 34 wherein the length of the first elongate portion is from 10 to 30cm

36. A targeting device according to claim 32 to 35 wherein the "L" shaped bar is positioned parallel to and spaced apart from the first component.

37. A targeting device according to claim 36 (when dependent on any of Claims 24 to 30) wherein the "L" shaped bar is mounted on the elongate support on the side of the first component opposite to that of the second component.

38. A targeting device according to Claim 37 wherein the "L" shaped bar is mounted on the elongate support such that the first elongate portion is parallel to the first component and the "L" shaped bar is movable along the longitudinal axis of the first elongate portion.

39. A targeting device according claim 37 or 38 wherein the "L" shaped bar is mounted on the elongate support such that the free end of the second elongate portion extends as far as the longitudinal axis through the first component.

40. A targeting device according to claim 39 wherein the free end of the second elongate portion is provided with a plate perpendicular thereto which lies along the longitudinal axis through the first component.

41. A targeting device according to claim 40 wherein the length of the second elongate portion, including any plate, is the same as the distance

WO 2005/055838

PCT/GB2004/005168

26

between the first component and the first elongate portion of the "L" shaped bar and this distance is 2 to 5cm.

42. A targeting device according to Claim 1 wherein the first component is an "L" shaped bar having a first elongate portion and a second elongate portion, the second elongate portion extending generally perpendicular to the first elongate portion and the second component is a second component according to the first embodiment.

43. A targeting device according to Claim 42 wherein the second component is movable in relation to the "L" shaped bar such that the second component is spaced apart from the free end of the second elongate portion of the "L" shaped bar by a distance that is half of the diameter of the femoral neck to allow the centreline through the femoral neck to be determined.

44. Use of the targeting device of any of Claims 1 to 42 in a method of locating the centre of the osteotomised base of the femoral neck at the head-neck junction, which method comprises:

-measuring the diameter of the femoral neck;

-dividing the diameter of the femoral neck by two to give value X and setting the distance between the first and second components of the targeting device as X;

-determining the mid line through the femoral neck in the AP plane and running a guide wire along this line through the first component of the targeting device of the present invention.

WO 2005/055838

PCT/GB2004/005168

27

45. Use according to claim 44 wherein a second guide wire is passed through the second component to mark the centre of the osteotomised femoral neck.

46. Use according to Claim 45 wherein the targeting device is then removed leaving at least the second guide wire in place.

47. Use according to any of Claims 44 to 46 wherein an "L" shaped bar is provided and positioned such that the free end of the second elongate portion of the "L" shaped bar rests on the femoral neck on the midline in the AP plane.

48. Use of a targeting device according to any of Claims 32 to 41 in a method of locating the centreline through the femoral neck and femoral head, which method comprises:

-measuring the diameter of the femoral neck;

-dividing the diameter of the femoral neck by two to give value X and setting the distance between the first and second components of the targeting device as X;

-determining the mid line through the femoral neck in the AP plane;

-positioning the free end of the second elongate portion of the "L" shaped bar on the femoral neck on the midline in the AP plane;

-determining the centreline through the femoral neck and femoral head by position of the second component.

WO 2005/055838

PCT/GB2004/005168

28

49. Use according to Claim 48 wherein a guide wire is passed through the first component once its position has been determined using the "L" shaped bar.

50. Use according to Claim 49 wherein a second guide wire is passed through the second component to mark the central longitudinal axis of the femoral neck.

51. Use according to Claim 50 wherein the targeting device is then removed leaving at least the second guide wire in place.

52. Use according to any of Claims 48 to 51 wherein the diameter of the femoral neck is measured using callipers or a suitable calibrated gauge.

53. A gauge for measuring the diameter of a femoral neck, which gauge comprises a first component and a second component wherein at least one of the first and second components is movable relative to the other said component and means is provided to determine the distance between the first and second components.

54. A gauge according to Claim 53 wherein the first component is fixed in position and the second component is movable in relation to the first component or vice versa.

55. A gauge according to Claim 53 or Claim 54 wherein the device is provided with a handle portion to which the first component is fixedly mounted.

56. A gauge according to Claim 55 wherein the first component is fixedly mounted to the handle portion by means of a generally semi-circular joining member.

WO 2005/055838

PCT/GB2004/005168

29

57. A gauge according to any of Claims 53 to 56 wherein the second component is slidably mounted on or within the handle portion and is movable towards and away from the second component.

58. A gauge according to any of Claims 53 to 57 wherein the distance between the first and second component is determined by the provision of a scale to show the distance between the first and second component depending on the relative positions of the first and second components.